RAIL CLIP FOR SEAT BASES

FIELD OF THE INVENTION

The present invention relates to the field of furniture and furniture construction, more particularly to the construction of flexible seat bases for sofas, couches and the like.

BACKGROUND OF THE INVENTION

Luxury chairs, sofas, and loveseats are well known in the art and have become a mainstay in many households. These types of furniture typically comprise a wood or metal frame defining a main seating area, an upright portion for cushioning a user's back, and two armrests. A plurality of sinuous wires typically extend across the main seating area upon which a seat cushion is positioned for providing a cushioning and comfortable seating area. In particular, sinuous wires allow the main seating area to flex and thus shape to the form of the user sitting in the chair.

In one conventional design, the main seating area includes a pair of angle irons secured to the wood frame for attaching the sinuous wires. In particular, the angle irons define slots for receiving clips that include a hook portion on one end for engaging the sinuous wires. In operation, each clip is slidably mounted through one of the slots in the angle iron, and the wires are then stretched over the hook of the remaining end of the clip such that the clip is put in a state of tension. This state of tension secures the sinuous wires across the main seating area. The clips, however, are susceptible to becoming dislodged from the slots, especially if upward tension is applied to the wires and the clips by lifting the seat from the bottom.

Another conventional design provides a plurality of metal clips that attach to the wood frame of the main seating area. The clips are individually attached to the wood frame by screws, nails, or integrated anchor tangs extending from the clip. However, each clip must be aligned in relation to the other clips and secured to the frame, which increases assembly time. Moreover, the clips are usually cut from a larger piece of metal, which increases manufacturing costs.

U.S. Patent No. 5,346,285 to West discloses a structurally reinforced furniture frame for a sofa or a chair. The furniture is reinforced using a metallic frame which

provides a rigid frame and supports the spring decking upon which furniture cushions rest. The individual springs that comprise the spring decking are attached to a plurality of elongated hooks. The elongated hooks are formed by punching thin gauge metallic material to form spaced 1 inch protrusions and then welding the metallic material to the metallic frame.

It would be desirable to have a reinforcing frame that is easily constructed and provides for the quick and firm attachment of springs to form a support for articles of furniture and furniture cushioning.

SUMMARY OF THE INVENTION

The present invention addresses the above needs and achieves other advantages by providing a rail clip, comprising an elongated rail that supports a plurality of hooks configured to hold a plurality of springs in a seat base, wherein the rail and hooks are constructed from a single metal piece, also referred to herein as a monolithic construction. The monolithic construction of the rail clip allows for the quick installation of the hooks in the seat base by eliminating the need to position and attach each hook individually. In addition, the hooks are configured to firmly receive and hold the plurality of springs during everyday repetitive loading and unloading of the furniture seat.

In one embodiment, the present invention includes a seat base having a pair of rail clips installed therein. The seat base includes a frame that has a first frame member spaced apart from a second frame member. The seat base also includes a first elongate rail attached to the first frame member and a second elongate rail attached to the second frame member. Spaced along each elongate rail is a plurality of hooks that are integrally formed on the elongate rail. The seat base further includes a plurality of springs each having first and second ends. The first end of each spring is attached to one of the integrated hooks on the first elongate rail, while the second end of the spring is attached to one of the integrated hooks on the second elongate rail. The springs are attached so that they stretch between the opposing first and second members to define a resilient structure for supporting the furniture seat, wherein each elongate rail and the hooks formed thereon comprise a monolithic structure formed from a single piece of material.

The plurality of hooks can be spaced at intervals along each elongate rail such that the attached springs are spaced at equidistant intervals. Spacing the springs at equidistant intervals provides uniform support for a furniture seat placed thereon. In another aspect, noise suppressing material (e.g., a tape) can be applied to the spring-engaging surfaces of each of the integrated hooks. The noise suppressing material reduces the squeaking that occurs due to relative motion of the spring and hooks during loading and unloading of the seat base.

Preferably, the rail clip is constructed from an elongate rail formed of a metal sheet. A plurality of tabs are cut or otherwise formed from the metal sheet and extend from one longitudinal edge of the rail. The tabs comprise integral extensions of the metal sheet spaced apart along the edge of the rail. The hooks are formed by bending the tabs out of the plane of the elongate rail. Each hook is configured to receive and firmly hold an end of a wire spring.

The furniture seat and rail clip of the present invention has several advantages. The hooks and the rail comprise a monolithic structure formed from a single piece of material, eliminating the step of assembling the rail clip before installation. In addition, the integral construction of the hooks eliminates the need to install and space each hook individually along the rail clip, or the frame of the seat base. The hooks have greater strength and are not susceptible to being dislodged and falling out like some conventional hooks, even when the seat is picked up from below. Once installed in the seat base, the rail clip provides additional reinforcement to the frame resulting in a more rigid seat base. Alternatively, the additional reinforcement provided by the rail clip can allow a reduction in thickness of the wood parts of the seat base without sacrificing strength.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

Figure **1** is a perspective view of a rail clip of the present invention;

Figure **2** is a plan view of the rail clip in Figure **1**;

Figure **3** is a plan view of a seat base including a pair of the rail clips of Figure **1** installed in the seat base;

Figure **3A** is an enlarged view of a spring end engaged in a hook of one of the rail clips from Figure **3**; and

Figure **4** is a cross-sectional view of the spring end engaged in the hook from Figure **3A**.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

The present invention includes a rail clip for seat bases **14** as shown in Figure **1**. The rail clip **14** includes a row of integrated hooks **16** formed from tabs extending from, and spaced along, one edge of an elongated, angled body **24**. The body **24** comprises a generally planar horizontal leg **25** and a generally planar vertical leg **26**. The hooks **16** are formed along a free edge of the horizontal leg **25**, i.e., the opposite edge from that to which the vertical leg **26** is joined. The vertical leg **26** includes holes **21** for fasteners, and the horizontal leg **25** likewise includes holes **22** for fasteners. Each elongate rail and the hooks **16** and **17** thereon comprise a monolithic structure formed from a single piece of material. The rail clip **14** along with a second rail clip **15**, a frame **11** and a plurality of springs **18** form a seat base **10** as shown in Figure **3**. The first rail clip **14** is attached to a first frame member **12** of the frame **11** using wood screws, nails or other fastening devices inserted through the holes **21** and/or **22** defined in the body **24**. Similarly, the second elongate rail clip **15** is attached to the second frame member **13** so that the rail hooks **16** on the first frame member are aligned with a row of rail hooks **17** on the second frame member **13**. The spaced distance between the first frame member **12** and the second frame member **13** defines a seating area upon which a sofa cushion (not shown) or other similar seating material is placed for the seating comfort of the seat user. The

seating area is spanned by the plurality of springs **18** that are connected between matching pairs of rail hooks **16** and **17** on rail clips **14** and **15**. The springs **18** are attached so that they are stretched in tension between the opposing first and second rail clips **14** and **15**, such that a resilient structure is formed for supporting the furniture seat.

As shown in Figures **1** and **2**, the elongate rail clip **14** is constructed by first notching the free edge of the horizontal leg **25** of the rail such that a plurality of tabs extend therefrom. The tabs are then punched, rolled or pressed into a hook shape to construct the row of hooks **16** for receiving the springs **18**. The first and second rows of holes **21** and **22** for fasteners can be drilled or punched into the L-shaped rail member **14**, separately, or during the same manufacturing process. Forming the rail hooks **16** from a single piece of material is advantageous in that the process is easily performed while at the same time the hooks have additional strength and improved durability compared with conventional, individually attached hooks. The row of hooks **16** could also be formed on elongated rails of other shapes, such as a flat sheet stock, but the angled shape of the body **24** is preferred due to its rigidity under bending loads and its ease of manufacture.

As shown in Figure **3**, the first and second elongate rail clips **14** and **15** are attached to vertical surfaces of the first and second frame members **12** and **13**, respectively, using the fasteners in holes **21** in the vertical leg of the L-shaped body **24**. The rail can also be fastened to a horizontal surface via holes **22**, or to a vertical surface via holes **21**, or both horizontal and vertical surfaces using both sets of holes. Preferably, the hooks **16** of the first rail clip **14** are aligned across the seating area with the second hooks **17** of the second rail clip **15**. The hooks **16** and **17**, and hence the springs **18**, preferably are spaced at regular intervals so as to uniformly support the furniture seat. The provision of the hooks **16** and **17** as integral parts of the rail clips is also advantageous in that alignment of the rail clips themselves aligns the rail hooks into evenly spaced, matched pairs. This is an improvement over conventional designs which use individually attached hooks where each individually attached hook must be spaced a proper distance from adjacent a hook and must also be matched up with a hook on the opposing side of the seat base.

Although the seat base **10** shown in Figure **3** is the seat base for a sofa chair, the size and dimensions of the seat base can be configured for use in a range of furniture

types such as a full-length couch, a recliner or a loveseat. The frame **11** of seat base **10** is shown in Figure **3** as a wood frame but could also comprise a range of other materials, such as plastic or metal, to which the rail clips **14** and **15** can be firmly attached for the placement of the springs **18**.

In other embodiments, it is possible to have the elongate rail clips **14, 15** form two sides of a generally rectangular metal frame. Thus, the ends of the rail clips can have a second pair of opposing members joined thereto. In this case, the metal frame may serve the strength-providing function of the wood frame **11** of Figure **3**. Wood members may also be included in the frame construction, if desired. Wood can be used to promote the attachment of cloth coverings to the seat using staples. The embodiment shown in Figure **3** also reduces the amount of wood needed to construct the frame **11** because the attachment of each elongate rail clip **14, 15** to its respective frame member **12, 13** helps to stiffen the frame members.

As shown in Figures **3A** and **4**, the rail hooks **16, 17** are configured to firmly receive the ends **19** of the springs **18**. The hooks **16, 17** extend upwards with respect to the bottom of the seat base **10** and back along the body **24** to define a long receiving slot **23** with respect to the body. The upward extending configuration of the hooks **16** and **17** allows them to be placed in the seat base **10** so that, once installed, the springs **18** pull inward and downward during loading, which minimizes the tendency of the spring ends **19** to slip free of their respective receiving slots **23**.

The depth and width of the receiving slots **23** are configured to firmly hold spring ends **19**, as shown best in Figure **4**. Each of the receiving slots **23** is of sufficient depth (i.e., several times the diameter of the spring wire) that some permanent elongation of the springs **18** can be tolerated and yet the springs **18** will not slip free of the receiving slots when unloaded. The receiving slot width aids in this task by being matched to the diameter of the spring **18** wire which allows the spring ends **19** to be press fit therein. A noise suppression material **20** such as tape, cloth or plastic can be used to line the receiving slot **23** at the interface formed by the spring ends **19** and the receiving slot **23**. The noise suppression material **20** is preferably a tape which is sticky on one side and adheres tightly to the receiving slot **23**, making it unlikely to wear or dislodge over time. The noise suppression material **20** has the advantage of reducing or eliminating

squeaking noises that occur during loading and unloading of the seat base **10** which induces movement of the spring ends **19** relative to the receiving slot **23**.

During assembly of the seat base **10**, a worker inserts the elongate rail **14** into the pre-assembled frame **11** and abuts one or both of the legs **25, 26** of the rail clip **14** against a surface of a frame member. In the illustrated embodiment, the vertical leg **26** is placed against a vertical surface of the frame member **12**. The worker then inserts nails, screws or other attachment devices through each of the holes **21** and into the wooden frame member **12**, thereby firmly attaching the first elongate rail clip **14** to the frame member **12**. The worker then positions the second elongate rail clip **15** against the second frame member **13** so that the first rail's hooks **16** are aligned with, and spaced across from, the second rail hooks **17**. Similar to the first elongate rail clip **14**, screws, nails or other fixation devices are inserted through the holes **21** of the second elongate rail clip **15**. The sinuous metal springs **18** (also sometimes referred to as "stretchers") are then elastically extended over matching pairs of the rail hooks **16** and **17** so that the spring ends **19** are firmly inserted into the receiving slots **23**. This process is repeated for each spring **18** of the seat base **10** until all of the hooks **16** and **17** are connected by the springs **18**. In an assembly step not shown herein, a cover of cloth or other material is typically attached using staples to the top edge of the frame **11** to cover the rail clips **14, 15** and the springs **18**. Additional rigidity can be imparted to the seat base **10** by the insertion of a cross-brace member (not shown) that attaches to the opposing rail clips **14, 15**. The cross-brace member inserts into a hole defined by two hooks adjacently formed on one of the rails.

The seat base **10** and rail clip **14, 15** of the present invention have several advantages. Less assembly time is required for the seat base because the hooks do not have to be individually inserted or affixed to the frame. Less assembly time is required for each rail clip because the hooks do not have to be affixed to the body **24** of the rail clip. Another advantage is that the monolithic construction of the rail clip retains the greater strength and rigidity of a single, continuous piece of metal. Attachment of the monolithic rail clips **14, 15** to the wood frame **11** stiffens the wood frame which reduces the amount of wood that must be used in the seat base **10** for the seat base. The integral construction of the hooks **16, 17** strengthens the hooks and eliminates the potential for the hooks to pop out from the body **24** of the rail clip **14, 15**, even when the seat base **10** is

picked up from below putting pressure on the springs in an upward direction. Also, the insertion of the spring ends **19** in their respective receiving slots **23** in a press-fit arrangement reduces the likelihood that the spring ends will come undone from the hooks **16, 17** during repetitive loading and unloading of the seat base.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.